AN ARDL MODELLING APPROACH TO INTERNATIONAL TOURISM DEMAND IN TANZANIA

By

Asimwe Bashagi

A mini dissertation submitted in partial fulfilment of the requirements for the degree of Masters of Commerce at the University of Cape Town

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CERTIFICATION

I, the undersigned, certify that I have read and hereby recommend for acceptance by the University of Cape Town a dissertation entitled **An ARDL Modelling Approach to International Tourism Demand in Tanzania**, in fulfilment of the requirements for the degree of Masters of Commerce at the University of Cape Town.

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ABSTRACT

The objective of this study was to model the extent of international tourist demand in Tanzania. Thus, the study aimed to investigate the factors affecting international tourism demand. Domestic tourism prices, travel costs, alternative destination tourism prices, exchange rates, world income and taste formation were selected as the main determinants. Dummy variables for the September 2001 USA terror attack and the 1998 Tanzania US embassy bombing were also included in the model. The dummy variables were treated in two different ways, to capture the temporary and permanent effects these events had on tourism demand. The study applied the Autoregressive Distributed Lag approach to modelling international tourist demand in Tanzania. The findings are consistent with economic theory and with empirical evidence from other studies. The model passed all diagnostic tests. Therefore, the results from this study may be used as a guide in formulating relevant tourism policy for Tanzania.

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CHAPTER I – INTRODUCTION

1.1 Background to the study

Tourism is a key sector worldwide, contributing substantially to economic growth. It has become more important in many countries, especially the least developed countries (LDC). The tourism sector acts as a way of fostering enterprise economy, by attracting Small and Medium Enterprises (SMEs). It has the ability to create jobs, generate foreign exchange earnings and provide tax revenues for government, and it creates strong linkages to other sectors of the economy. The tourism sector is also characterised by dynamic economic activities, which can be tied together in order to tackle the problems of poverty in poor countries directly (WTO, 2002). Thus, tourism as an economic activity has gained importance in both developed and under-developed countries.

Tourism is one of the fastest-growing activities in the world. The sector has an estimated five per cent growth rate annually, making it economically and socially significant (Wall and Mathieson, 2006). According to the 2007 United Nations-World Tourism Organisation (UNWTO) report, the number of international travellers worldwide has grown from 689 million in 2000 to over 846 million in 2006, and is forecasted to reach nearly 1.6 billion worldwide by 2020. Of the total worldwide international tourist arrivals in 2006, 51 per cent were for purposes of leisure, recreation and holidays. Hence, tourism is regarded as a luxury, and as a voluntary activity (Wall and Mathieson, 2006).

The 2007 UNWTO report estimated that in 2006 there were international tourism receipts of approximately US$ 733 billion, an increase of 51 per cent over the US$ 484 billion recorded in 2000. International tourism also accounts for the highest share of world trade, with an estimated 27 per cent of total trade in services for 2006. However, compared to the developed countries, globally LDCs have benefited only marginally from this sector. That said, tourism is still the principal foreign exchange earner for about 83 per cent of developing countries (Roe *et al*, 2004). Also, the tourism sector is resource- and labour-intensive, providing a comparative advantage to developing countries.

Africa's wealth of nature, history and culture offers a different range of attractions and destinations to other parts of the world (WTO, 2004). This may be why the African tourism sector has performed relatively well in the past few years, in spite of globally unfavourable conditions such as the terrorist threat and political instability. Thus Africa is viewed as being one of only two regions (the other being Asia and the Pacific) of the WTO that has had positive results recently in terms of tourism (WTO, 2004).

International tourist arrivals in Africa have grown by 58 per cent over the seven years since 2000, to 44.3 million arrivals in 2007. This is forecasted to reach 77 million tourist arrivals by 2020 (WTO, 2007). Though this sounds a lot, international tourist arrivals in Africa are currently concentrated in relatively few destinations. Regionally, in the past 10 years, Northern and Southern Africa attracted two-thirds of total arrivals in the region; East Africa drew about 23 per cent; and West Africa attracted 10 per cent, leaving Central Africa with only three per cent of

total arrivals. Taken by country, the picture is similar. Only South Africa, Tunisia, Morocco and Zimbabwe receive over a million arrivals per year; together, these four countries attract about 63 per cent of international arrivals in the whole of Africa (WTO, 2007). Only seven other African countries receive between half a million and a million arrivals per year, and Tanzania is one of them.

The growth of international tourism to Africa has been sustained for the past decade, with the annual growth rate in arrivals being above eight per cent – almost two percentage points higher than the annual growth rate of the whole world. In spite of these achievements, tourism expenditure in Africa is still low compared to the rest of the world. In 2007, Africa's international tourist earnings amounted to US$ 24 329 million, accounting for only 3.3 per cent of total world tourism earnings; during the same period, Africa held only a five per cent share of the world tourism market (WTO, 2007). In spite of this, many poor African countries depend on tourism to be their main foreign exchange earner. Tourism has added much to those countries in the way of exports, capital, investment and employment: hence, tourism has the potential to foster sustainable development in Africa.

1.1.1 Tourism in Tanzania

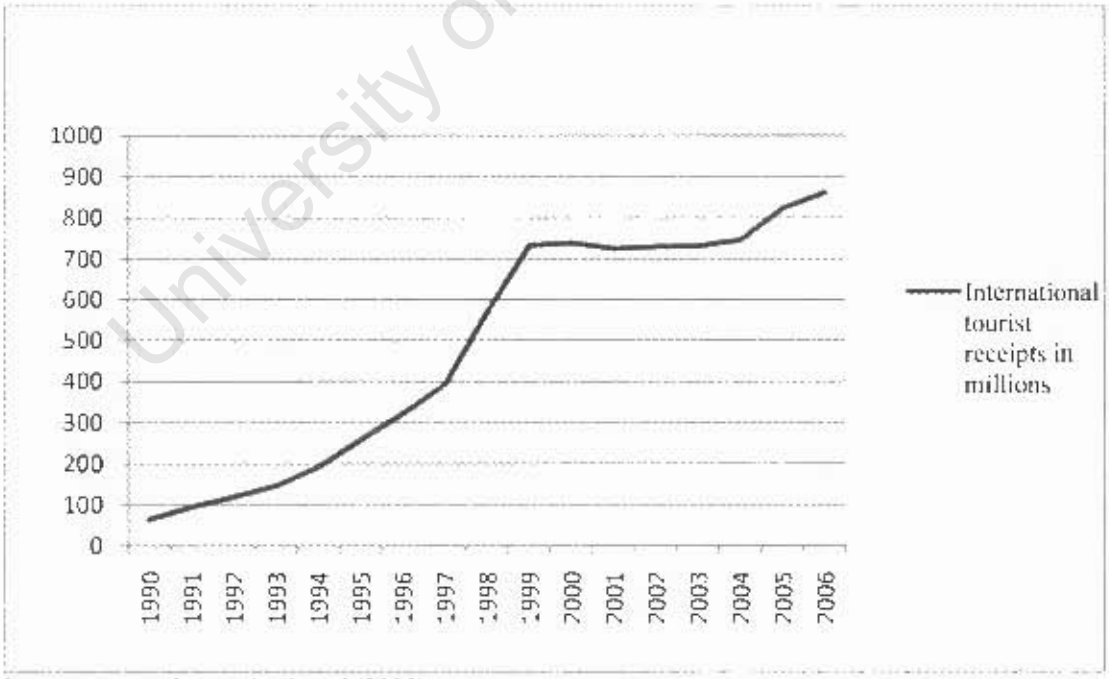
After independence, for many years Tanzania's economy depended largely on subsistence agriculture and a few export crops such as coffee, tea, and cotton, and a small industrial base. During the 1990s the government put more effort into the search for a more robust sector with which to widen the country's economic foundation. Tourism was recognised as an industry that potentially could promote and accelerate the socio-economic development of the country, particularly as a

supplier of foreign exchange earnings and an employment provider. In addition, the tourism sector contributes to the development of the country by promoting the development of supporting sectors, such as transport and construction. As a result, tourism emerged as one of the major economic sectors in Tanzania, with significant value to the national economy.

1.1.1.1 International tourism in Tanzania

In the past two decades, international tourism has been the fastest-growing industry in Tanzania. The earnings from international tourism have increased substantially, from US$ 258.4 million, recorded in 1995, to US$ 862 million in 2006 (Figure 1.1).

Figure 1.1: International tourist receipts in US$ millions

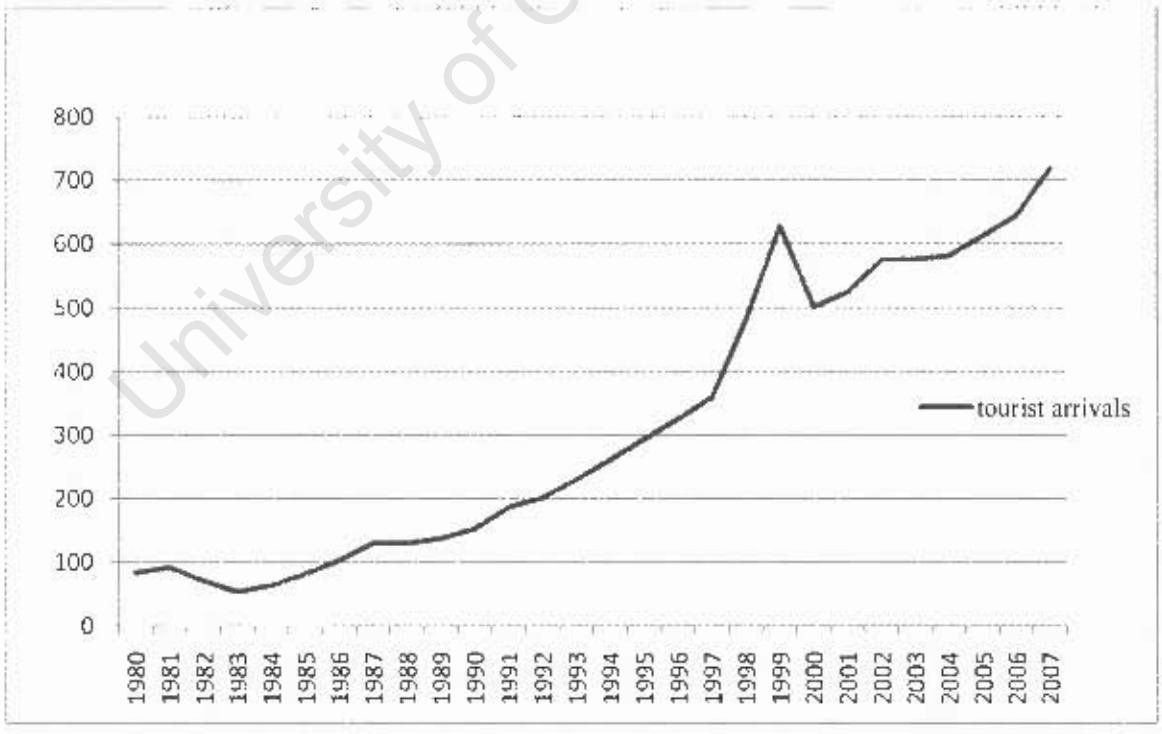


Source: Tanzania Tourist Board (2008)

Concurrently with tourist earnings, total tourist arrivals have also increased dramatically. In the mid-1990s, and thereafter, total tourist arrivals grew by an annual average rate of about 10 per cent. The number of international tourist arrivals increased from 293 834 in

1995 to 719 031 in 2007 (see Figure 1.2), but declined slightly in 2001 due to the September 2001 USA terror attacks. According to Tanzania tourism sector survey; 2005 International Visitors Exit Survey Report, the top ten tourism markets for Tanzania are the United States of America, the United Kingdom, Italy, Germany, Spain, France, South Africa, the Netherlands, Australia and Canada (Ministry of Natural Resources and Tourism, 2007). The same survey indicated that the average length of stay in Tanzania was 12 days in 2005, an increase from an average of 7.5 nights in 1997. International tourism is regarded as a luxury activity in Tanzania because about 81 per cent of the total international arrivals to Tanzania come to the country for the purpose of leisure, recreation and holidays.

Figure 1.2: Tanzania tourist arrivals in thousands, 1980-2007



Source: Tanzania Tourist Board (2008)

Tourism is regarded as one of the key sources of foreign exchange earnings in the Tanzanian economy (WTO, 1998). The country expects to attract 1 million

international arrivals per year by the year 2010, with earnings from the industry estimated to reach US$ 1 billion during the same period (Tanzania Tourism Board, 2007).

The tourism sector in Tanzania has a positive impact on Gross Domestic Product (GDP), employment and investment. During 1995, it was estimated that the sector accounted directly for about 7.5 per cent of GDP and nearly 25 per cent of total export earnings, and directly supported an estimated 25 700 jobs. In 2006, the tourism sector contribution improved dramatically, accounting for approximately 16 per cent of GDP (WTO, 2007). During the same period, receipts on the travel account (regarded as a close proxy for tourism earnings) represented about 40 per cent of total exports of goods and services, making tourism one of the largest export sectors, outperforming even traditional cash crops such as tea and coffee (Tanzania Investment Centre, 2005). In 2008, the tourism sector was estimated to have created about 719 000 jobs, directly and indirectly (WTTC, 2008).

These recorded improvements in tourist arrivals and earnings have triggered a significance increase in interest in the tourism industry, including investment in the construction of new hotels and the refurbishment of old ones. In 2006 tourism's contribution to total investment was estimated at 13.6 per cent, and the sector ranked third in attracting direct foreign investment, after mining and manufacturing (Tanzania Investment Centre, 2005).

The United Nations World Tourism Organization (UNWTO) and the World Travel and Tourism Council (WTTC) have reported on the great potential of the tourism

sector in Tanzania, largely due to its unique destinations, government's dedication to the sector, and the country's peace and stability. Improved marketing and government support to the sector and improved local and international air services have also increased awareness of the destination, and have created more demand. The continuing improvement in infrastructure has made the vast growth and development of the tourism sector in the country possible. Growth has also been experienced in sectors that support tourism, such as transport, communication, agriculture and trade.

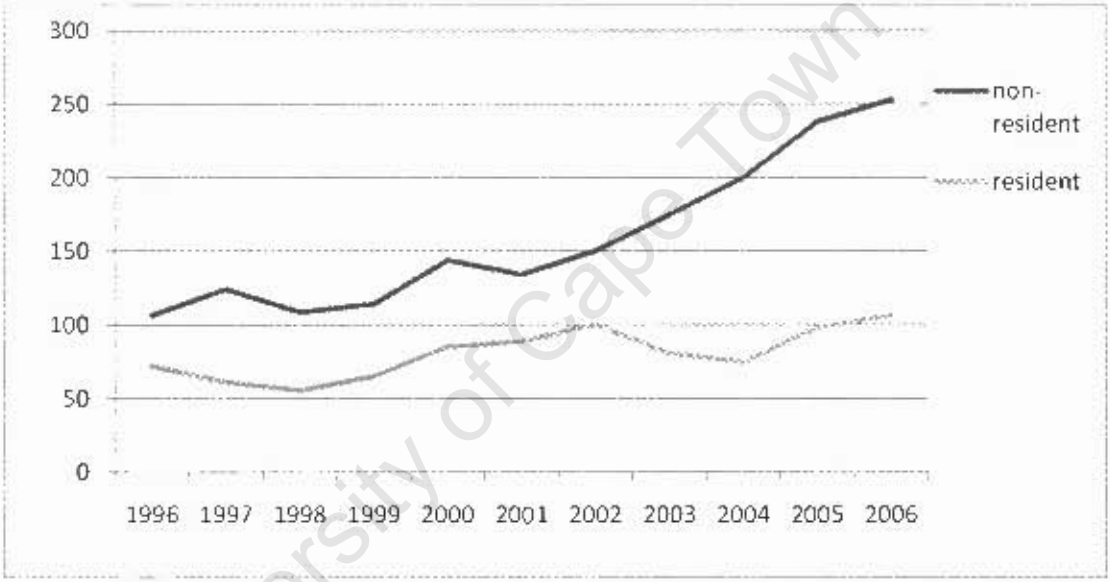
1.1.1.2 Domestic tourism in Tanzania

Although both international and domestic tourism are very important to the Tanzanian economy, domestic tourism has not grown to its full potential, since the majority of Tanzanians are too poor to be able to afford leisure visits for tourism purposes. There are also problems of inadequate knowledge and incorrect perceptions; even some of those who can afford to be tourists still do not know what tourism destinations are available, or their significance, and a lot of Tanzanians perceive the costs of tourism to be too high. This is despite the availability of special packages for residents which include reduced flight fees, airport transfers and lower hotel accommodation costs . Man y residents also have the notion that it is only international visitors who should use the various hotels and lodges in the wild and on the coast for their holidays. All these factors contribute to hindering the full growth potential of domestic tourism in Tanzania.

International and domestic tourism will probably continue to be an important industry in Tanzania. This study focuses on international tourism because it is the

fastest-growing industry, and earnings from the industry are continuously increasing (see Figure 1.1). In addition, there is an increase in the number of international visitors compared to domestic visitors (see Figure 1.3). Tanzania is also one of the few African countries to receive more than half a million international tourist arrivals per year, with the potential for rapid growth in the future.

Figure 1.3: Visitor arrivals – Ngorongoro conservation area 1996-2006



Source: Ministry of Natural Resources and Tourism, 2007

1.2 Statement of the problem

Tanzania is best known to the rest of the world for its mineral resources and tourist attractions. The country averaged a six per cent annual GDP growth rate between 2000 and 2006. It must be said that agriculture remains one of Tanzania's key economic sectors, accounting for over 50 per cent of the GDP, and employing about 80 per cent of the total labour force. However, tourism is becoming one of the major economic sectors in Tanzania, growing to approximately 16 per cent of the GDP in

the year 2006, from less than one per cent of GDP in the 1990s. Over the same period, total export earnings from tourism increased from 12 per cent to 40 per cent.

The rapid growth in Tanzania's tourist sector is a consequence of the country's unique tourist destinations, which offer an abundance of wildlife and a variety of other natural attractions. These destinations include Mount Kilimanjaro, the Ngorongoro crater, the Serengeti National Park and the Selous game reserve. Tanzania also has attractive natural beaches and different cultural heritage sites, among them the historical sites of Bagamoyo and Zanzibar Stone Town. As Tanzania is a sought-after destination for both sun-worshippers and adventure travellers, with documented high tourist arrivals and receipts, the country should be ready for the expected additional increase in mass tourism and tourist earnings.

Although tourism in Tanzania is growing fast, the determinants of international tourism demand have not been well explored. Thus there is no clear research model of international tourism demand in Tanzania. Therefore the study seeks to address this problem.

1.3 Objectives of the study

The main objective of the study was to analyse international tourism demand in Tanzania, with a view to generating a model for international tourism demand in the country. This study sets out to explore the major factors affecting the level of tourist flow into the country. The study also investigates the usefulness of tourism demand in gathering information for promoting tourism and enhancing macro-economic policy.

Specifically, the study attempts to:

(i) model international tourism demand in Tanzania using the most up-to-date econometric approach available (the ARDL approach);

(ii) estimate the parameters of the tourism demand function in Tanzania;

(iii) give recommendations for enhancing international tourism demand in Tanzania, on the basis of the above results.

1.4 Significance of the study

The tourism sector in Tanzania has the added advantage of creating employment for the poor, in addition to being the country's main source of foreign exchange; hence, tourism leads to economic diversification. The sector could be a prominent contributor to the prosperity of the nation, by realising high income and development for the Tanzanian economy.

To this end, the study will shed light on what the Tanzanian government can do to maximise international tourism demand in the country, in order to reap the economic benefits of tourism for economic growth and poverty alleviation. This will contribute to the government's strategy of trying to ensure that the tourism industry is elevated to being a major contributor to the national economy.

1.5 Scope of the study

The scope of this study covers the period from 1996 to 2006, using secondary data extracted on a monthly basis. International tourist arrivals in Tanzania from around the world were used as the dependent variable in analysing the determinants of

international tourism demand in the country. The explanatory variables used in the study were economic variables, including world income, relative prices, exchange rates and transport costs.

1.6 Organisation of the study

This study is organised into four chapters following this introductory section. Chapter II presents the theoretical factors identified as having an influence on international tourism demand, and an empirical review of the methodology used in related studies. Chapter III discusses the methodology used in this study, and the reason of choosing such a methodology. In Chapter IV, results from various tests and estimations are presented. Chapter V is a conclusion, which includes a summary of the study and policy recommendations.

CHAPTER II – LITERATURE REVIEW

2.1 Introduction

This chapter discusses the factors affecting international tourism demand and presents an empirical review of the methodology used in other studies on international tourism demand. The chapter is organised as follows: section 2.2 presents theoretical and empirical arguments regarding the factors influencing tourism demand, and section 2.3 provides a brief empirical review of the literature concerning the methodology used in other studies on international tourism demand.

2.2 Empirical review of the factors that influence tourism demand

"Tourism may be defined as the activities of persons travelling to and staying in places outside their usual environment, for not more than one consecutive year, for leisure, business or other purposes" (WTO, 2007). "Tourism is also a dynamic and competitive industry that requires the ability to constantly adapt to customers' changing needs and desires, with the tourism businesses' focus on customers' satisfaction, safety and enjoyment" (WTO, 2007).

2.2.1 Tourism demand

Tourism demand is defined as the amount or number of a set of tourist products that consumers are willing to acquire during a specific period of time and under certain conditions, which are controlled by the explanatory factors employed in the demand theory (Song and Witt, 2000). According to the econometric modelling of tourism demand, there is no standard measure of tourism flow that is universally acceptable.

A number of studies use different variables as a proxy for tourism demand, for example tourist expenditure or receipts, tourist arrivals or departures, travel exports or imports, the number of tourist–nights spent at tourist accommodation, and average length of stay (Crouch, 1994a). Of these, tourist arrivals or departures is the most frequently used as a proxy for tourist demand (Lim, 1997).

2.2.2 Factors influencing tourism demand

Tourism demand tends to follow the general law of demand. An increase in tourism prices tends to reduce the demand for international tourism. Tourism prices include the cost of access to tourism facilities and the cost of commodities consumed by tourists in the destination country, including transport costs.

The demand for transportation in international travel is a derived demand, as it is the consumer who must be transported to the point of destination (Lim, 1997). According to Crouch (1994a), 58 per cent of studies examined used the cost of transportation as an explanatory variable. Transportation costs are measured by the price of air travel, while fuel prices proxy surface travel between country of origin and destination cities. However, oil prices are assumed to be the main driver for both road and air fares (Lim, 1997).

Relative prices of goods in points of origin may be proxied by tourist price index or consumer price index. Though many scholars support the use of the tourist price index (Lim, 1997), most studies use the consumer price index to account for the price of tourist goods, since many countries do not compute tourist price index. However, the study by Martin and Witt (1988) did not find significant differences in

explanatory power between tourist price index and consumer price index; thus, tourist price index and consumer price index may be used interchangeably.

Some models use tourist or consumer price index adjusted for the exchange rate, while others separate the tourist or consumer price index and the exchange rate. Separation is based on a tourist's up-to-date information about the exchange rate, rather than prices of commodities in the destination country (Webber, 2001). It can be seen that consumer price index and exchange rate responsiveness to international tourism demand are different. Of the total studies examined by Crouch (1994a), 70 per cent used price of tourist goods and services (own and cross-prices) as the variable that has most impact on international tourism demand.

Income in country of origin is another frequently-used explanatory variable for determining international tourism demand, used in 89 per cent of studies examined by Crouch in his 1994a report. Tourism is viewed as a luxury good, with estimated income elasticity between 1.0 and 2.0 (Lim, 1997). Tourism income is defined as remaining income after purchasing necessities; this is viewed as an appropriate income variable for determining the demand for tourism. Therefore, an increase in world income increases international tourism demand. In many cases, this variable is not precisely measurable; thus most studies use nominal or real (per capita) personal, disposable, or national income, and GDP, as measures for income (Lim, 1997).

The exchange rate is the ratio between the currencies of the countries of destination and origin. A change in the exchange rate affects the value of the currency of the country of origin (Lim, 2004); hence, changes in exchange rate will lead to the

appreciation or depreciation of a tourist's currency. Appreciation will encourage more people to travel, and depreciation will discourage people from travelling.

As with the demand for any other commodity, a specific event can lead to positive or negative shocks on the demand for international tourism. In many international demand models, dummy variables are included with the objective of measuring the effects of specific events (Salleh *et al*, 2008). These models are constructed such that dummy variables take the value of 1 when the event occurs, and 0 otherwise.

Specifically, Salleh *et al* (2008) studied the tourism demand for Malaysia using a Bound Test approach with the objective of identifying the factors that influence tourist arrivals to Malaysia from Asian countries. The results showed that tourism price, travelling costs, substitute price and income were the major determinants of tourism demand in Malaysia. However, in the short term, it was word of mouth effects, the world economic crisis (1997-1998) and the outbreak of SARS that significantly affected the demand for tourism in Malaysia.

Halicioglu (2004) examined an aggregate tourism demand function for Turkey using time series data for the period 1960-2002. The results revealed that total tourist arrivals into Turkey were related to world income, relative prices and transportation cost. The author employed the bounds-testing cointegration procedure proposed by Pesaran *et al* (2001) to compute the short- and long-run elasticities of income, price, and transportation cost variables. The empirical results indicated that income is the most significant variable in explaining the total number of tourist arrivals in Turkey.

2.3 Empirical review of methodological issues

2.3.1 Traditional econometric methodologies

Many studies on international tourism demand have adopted log linear models rather than linear models (Crouch, 1994b). For example, the results of studies by Vanegas and Croes (2000) on the US demand for tourism in Aruba showed that log linear models performed much better than linear models.

Single equation models with explanatory variables selected from the theoretical demand theory have traditionally been used for analysis of tourism demand (Kulendran and Witt, 2001). The most popular method of estimation is the Ordinary Least Square (OLS) method – it was shown that out of the 93 studies on demand for tourism that were examined, 73 were based on OLS regression (Crouch, 1994b).

Lim (2004) reviewed 100 published empirical tourism studies, looking at data and sample sizes used, the model specifications, the choice between dependent and explanatory variables, and the number of explanatory variables. The paper discussed alternative functional forms, and analysed the choice of dependent variable and the number and choice of explanatory variables. Lim (2004) concluded that most studies used annual data, and were based on estimations of log linear single-equation models.

2.3.2 Modern econometric methodologies

Violation of any assumption of the Classical Linear Regression Model (CLRM), especially the assumptions of the error term for OLS static analysis, results in invalid regression estimation (Salleh *et al*, 2008). To avoid spurious regression results, the

data used in regression analysis should be stationary, since stationary data allows the error term to meet all the Classical Linear Regression Model assumptions. Differencing the variables will make the data used in the regression analysis stationary; however, this will generate a short-run estimation and ignore the long-run relationship between the variables.

To overcome the problems of traditional econometric methods, modern econometric methodologies have been employed in recent studies on the demand for tourism. Researchers apply dynamic analysis to avoid the spurious results produced by static analysis regression (Salleh *et al*, 2008). The most popular dynamic methodologies are the cointegration methods, which describe long-run equilibrium and dynamic short–run relationships. The major approaches used by cointegration analysis are the Engle-Granger cointegration framework (1987); Johansen and Juselius' multivariate cointegration framework (1990); and the framework of Pesaran *et al* (2001), which is referred as the Autoregressive Distributed Lag (ARDL) method.

The main advantages of the ARDL model is its flexibility compared to other models such as Engle-Granger and Johansen and Juselius. The ARDL model does not require *a priori* knowledge about the integration properties of the variables (Pesaran et al 2001). It also provides consistent estimates of long-run coefficients that are asymptotically normal, for both stationary and non-stationary variables (Pesaran *et al*, 2001). The ARDL approach provides valid t-statistics and unbiased estimates of long-run coefficients even when some of the regressors are endogenous (Harris and Sollis, 2003), and hence assists in correcting the endogeneity bias in the models. Moreover, a dynamic Error Correction Model (ECM) can be derived from ARDL

through simple linear transformation (Barnerjee *et al*, 1993). This means the ECM integrates short-run dynamics with long-run stability, without losing the long-run information.

Kulendran and Witt (2001) examined different methodologies applied to measuring international tourism demand, in particular, comparing the least squares regression models to the more recent cointegration models. The empirical results demonstrate that the forecasts produced using cointegration methods were more accurate than those generated by least squares regression.

Li, Song, and Witt (2005) studied 84 empirical studies using econometric approaches to modelling and forecasting international tourism demand. Cointegration econometric methods were identified, and it was shown that the application of these econometric methods improves the understanding of international tourism demand.

In Thailand, Chaitip (2005) investigated the short-run and long-run relationships between international tourism demand and its determinants, such as GDP, the price of jet fuel, the exchange rate and the temperature in the country. The author used the autoregressive distributed lag (ARDL) approach to cointegration in estimating Thailand's international tourism demand. The short-run and long-run relationship results indicated that growth in income, an increase in the price of jet fuel, exchange rate variations and the temperature in Thailand affected the number of international tourist arrivals to Thailand.

CHAPTER III – METHODOLOGY

3.1 Introduction

This chapter addresses the issues of model specification and estimation technique, and describes the data used in analysing international tourism demand in Tanzania. The study adopts the log linear model, using the recent cointegration approach – the ARDL approach by Pesaran *et al* (2001) – in constructing an international tourism demand model for Tanzania.

3.2 Model specification and choice of variables

The majority of empirical studies model the flows of tourism between the origin and destination countries by specifying a demand model function (Lim, 1997) of the type:

$$Q = f(Y, RP, T, EX, QF) \quad \ldots\ldots(1)$$

Where: Q stands for tourist demand in the destination country;

Y is the income per capita in the country of origin;

RP is a relative price index, to measure price levels between origin and destination countries and in alternative countries (Stucka, 2002);

T is the Transport costs;

EX is the currency exchange rate, measured as units of destination country currency per unit of origin country currency;

QF is the qualitative factors in the destination country.

This theory of demand provides the specification base used for modelling international tourism demand, where demand for international tourists is expected to

be positively correlated to income in the country of origin, and negatively correlated to both transportation costs and relative tourism prices (Lim, 1997).

Thus the demand model for international tourism in Tanzania using equation 1 above can be specified as:

$$Q = \alpha_0 + \beta_1 Y + \beta_2 RP + \beta_3 T + \beta_4 Ex + \beta_5 QF + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

3.2.1 Dependent variable

The study adopted the number of international tourist arrivals (Crouch, 1994a) as a proxy for the demand of international tourism in Tanzania. Data on tourist arrivals in Tanzania was obtained from the Tanzania Tourism Board (TTB) Bulletins. The data on international tourist arrivals is well documented because of the compulsory completion of disembarkation cards, which provide accurate data.

3.2.2 Independent variables

The study used taste formation, domestic tourism prices, alternative destination tourism prices, income in country of origin, transport costs and dummy variables (the 1998 Tanzania US embassy bombing, and the September 2001 US terror attacks) as the main determinants of international tourist demand in Tanzania.

The lagged value of international tourist arrivals to Tanzania was used to proxy taste formation. Domestic tourism prices were proxied by the ratio of Tanzania consumer price index (CPI) relative to USA CPI, which represents the world cost of living. As mentioned previously, though some studies advocate the use of a tourist price index

(Lim, 1997) or services price index, neither of these have ever been computed for Tanzania. Data on Tanzania and USA CPI was obtained from the international Financial Statistics (IFS) database (IMF, 2008).

The exchange rate between the Tanzanian shilling and the US dollar proxied the exchange rate between Tanzania and the world, given that the USA is traditionally a major source of international tourism in Tanzania, and since most tourists who come to Tanzania use US dollars. This data was also obtained from the IFS database (IMF, 2008).

The United States income proxies world income, as trends in global income tend to follow the economic activities of the United States. However, this study used the US unemployment rate as a proxy for the changes in world income, since the monthly data on real GDP per capita for the US is not available. The unemployment rate data was also obtained from the IFS database (IMF, 2008).

Since oil prices are major drivers for road transport prices and air fares, the monthly average of world oil prices was used as proxy transport costs. This data was obtained from the US Energy of Department, energy information administration website, Dec 2008.

Kenya is regarded as the substitute destination for international tourism demand in Tanzania. As with Tanzanian domestic tourism prices, the tourism price in Kenya (the alternative tourism destination) was proxied by the ratio of the Kenyan CPI

relative to the USA CPI. Relative CPI on services for Kenya was unavailable. Data on the Kenya CPI was obtained from the IFS database (IMF, 2008).

3.3 Estimation technique

3.3.1 The Autoregressive Distributed Lag (ARDL)

This study adopted the log linear model (see Equation 3 below) to model tourism demand in Tanzania, as it has proved to be more accurate than the linear models (Crouch, 1994b), as stated previously. Thus, all variables in our model (Equation 3) are in natural logs, except for the dummy variables.

The study used the Autoregressive Distributed Lag (ARDL) approach developed by Pesaran *et al* (2001). The ARDL to cointegration is a dynamic model that captures both the long-run and short-run relationships. The study uses this model to estimate international tourism demand in Tanzania. The ARDL approach to the demand model may be expressed as equation (3) below:

$$Visits =$$

$$\alpha_0 + \sum \beta_1 visits_{t-i} + \sum_{i=0}^{q} \beta_2 TRP_{t-i} + \sum_{i=0}^{j} \beta_3 KRPi_{t-i} + \sum_{i=0}^{s} B_4 Unemp_{t-i} +$$

$$\sum_{i=0}^{s} B_5 Oilprice_{t-i} + \sum \beta_6 exr_{t-i} + \sum_{i=0}^{p} \delta_i D + \varepsilon_t \ldots\ldots\ldots\

Oilprice is the natural log of the international oil price;

exr is the natural log of the Tanzanian exchange rate;

D is a dummy variable representing the August 1998 Tanzania US embassy bombing and the 11 September 2001 US terrorist attacks;

ε_t is the disturbance term, assumed to be serially uncorrelated.

All the coefficients of the variables in natural logs are interpreted as elasticity of international tourism demand, while the coefficient of the dummies is translated into percentage changes in average holiday visits after the specific event occurred.

The dummy variables (D) have been specified in order to separate the events into two categories. The first category is intended to capture the permanent effect of an event on international tourist visits; thus, a dummy is included for the period from the event occurrence onwards. The second category captures the temporary effects of the event on international visits to Tanzania; that is, the effects of an event for the few months after it occurs.

3.3.2 Long-run and short-run relationship

From Equation 3 above, the error correction model (ECM) of the ARDL approach to cointegration model is given by:

$$\Delta Visits = \alpha_0 + \sum \beta_{1i} \Delta visits_{t-i} + \sum_{i=0}^{j} \beta_{2i} \Delta TRP_{t-i} + \sum_{i=0}^{k} \Delta KRP_{t-i} + \sum_{i=0}^{l} B_{4i} \Delta Unemp_{t-i} + \sum_{i=0}^{m} B_{5i} \Delta Oilprice_{t-i} + \sum_{i=0}^{n} B_{4i} \Delta exr_{t-i} + (\lambda_1 visits_{t-1} + \lambda_2 Tcpi_{t-1} + \lambda_3 UScpi_{t-1} + \lambda_4 \Delta Unemp_{t-1}) + \delta_1 D1 + \delta_2 D2 + \mu_t \quad (4)$$

The ECM of the ARDL approach describes both the short-run and the long-run relationship. The β_i coefficients represent the short-run relationship of the variables in the first part of Equation 4, while the λ_i coefficients represent the long-run relationship of the model in the second part of Equation 4.

3.3.3 Unit root tests

The ARDL approach to cointegration does not require the pre-testing of the variables by the unit root test (Pesaran *et al*, 2001). The ARDL approach is based on the assumption that the variables are I(0) or I(1), and that if the variables are integrated in a higher order than one, the computed F-statistics will no longer be valid (Pesaran *et al*, 2001).

3.3.4 Bounds test for cointegration

When the ARDL bounds test for the cointegration approach, as developed by Pesaran *et al* (2001), is performed, the result will be valid only when there is a single cointegration vector. A way of testing for the existence of unique cointegrating vectors in the ARDL framework was also suggested by Pesaran *et al* (2001).

The ARDL bounds test for cointegration involves three steps: The first step is to estimate the ARDL Error Correction Model (ECM) with equation (5) below, using Ordinary Least Square (OLS). The ECM of the ARDL approach to cointegration model is given by:

$$\Delta Visits = \alpha_0 + \sum \beta_{1i} \Delta visits_{t-i} + \sum_{i=0}^{j} \beta_{2i} \Delta TRP_{t-i} + \sum_{i=0}^{k} \Delta KRP_{t-i} +$$

$$\sum_{i=0}^{l} B_{4i} \Delta Unemp_{t-i} + \sum_{i=0}^{m} B_{5i} \Delta Oilprice_{t-i} + \sum_{i=0}^{n} B_{4i} \Delta exr_{t-i} +$$

$$(\lambda_1 visits_{t-1} + \lambda_2 Tcpi_{t-1} + \lambda_3 UScpi_{t-1} + \lambda_4 \Delta Unemp_{t-1}) + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

The second step involves testing for the presence of cointegration by restricting all estimated coefficients of lagged level variables equal to zero; that is, the null hypothesis of no cointegration (H0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$) is tested against the alternative of the existence of cointegration (H1: $\lambda_i \neq 0$). Judging the F-statistics with an asymptotic non-standard distribution, two asymptotic critical value bounds for testing cointegration between the variables are provided (Pesaran *et al*, 2001). The critical values have a lower bound (F_L) and an upper bound (F_U); the lower bound assumes that all the regressors are I(0), while the upper bound assumes all the regressors are I(1). If the computed F-statistic lies above the upper level of the band, the nulls are rejected, indicating the existence of a cointegration relationship; but, if the computed F-statistic lies below the lower level band, the null cannot be rejected, indicating the absence of cointegration. If the statistic falls within the band, the test is inconclusive.

The third step involves re-estimating the unrestricted ECM version of the ARDL model in Equation 5, during which each of the independent variables in turn is made the dependent variable. Then, as in the second step, testing for the joint significance of coefficients is conducted. The significant joint variable F-tests determine the number of cointegrating vectors. In order to proceed with estimating the ARDL model given in Equation 3, we need a unique cointegrating vector.

After confirmation of the existence of a long-run relationship between the variables in the model, the appropriate order of lags for the ARDL model can be chosen using the Schwartz Bayesian or the Akaike Information Criteria (Enders, 2004).

CHAPTER IV – MODEL ESTIMATION AND EMPIRICAL RESULTS

4.1 Introduction

The chapter presents and discusses the empirical results of the study, including results from various tests that were necessary to establish the extent of international tourism demand in Tanzania. The analysis is based on the econometric estimation of an ARDL model outlined in Chapter III. To perform the analysis, the study used the econometric package STATA (version 10). The results are organised in three sections: section 4.2 shows the unit root test results; section 4.3 shows the bounds test for cointegration results; and section 4.4 presents the analysis and interpretation of the results.

4.2 Unit root test

The study used the traditional unit root tests: the Augmented Dickey-Fuller (ADF) proposed by Dickey and Fuller (1979) and the Phillips-Perron (PP) test proposed by Phillips and Perron (1988). ADF uses additional lags of the first-difference variable, while PP uses Newey-West standard errors to account for serial correlation. Given the large sample size of this study, the tests were appropriate for testing the unit roots of the variables in the study.

Unit root test results are presented in Table 4.1 below. The unit root test was performed to eliminate the possibility of presence of variables of higher order than one. The results indicate that the conditions relevant for applying the ARDL approach have been fulfilled, as none of the variables included in equation (2) were I(2) or of a greater order.

Table 4.1: Unit root tests for variables

Variables	ADF [with no Lags]	Phillip Perron (PP) [N west Lag (4)]	Decision
visits	-5.086**	-42.045**	I(0)
KRP	0.041	-0.238	
DKRP	-6.743**	-64.106**	I(1)
TRP	-2.109	-4.609	
DTRP	-6.408**	-67.722**	I(1)
Oilprice	-0.853	-1.695	
DOilprice	-12.105**	-129.981**	I(1)
Unemp	-2.989*	-10.907	I(0)
exr	-0.918	-0.705	I(1)
Dexr	-8.896**	-88.660**	

* null hypothesis is rejected at 5% level, ** null hypothesis is rejected at 1% level

4.3 Bounds test for cointegration

The results of the ARDL bounds test for cointegration are reported in Table 4.2 below. Only the F-statistic of the model that has international arrivals (visits) as the dependent variable (F_V = 4.63) is greater than the critical value of the case that all variables are I(1) at the five per cent level. Thus, the null hypothesis of no long-run relationship is rejected, confirming the existence of a unique cointegration vector among the variables.

Table 4.2: The bounds test for cointegration

Dependent variable	Visits	TRP	KRP	Unemp	Oilprice	Exr
F-Statistic	4.63*	2.55	1.52	1.25	1.86	--

Note: * significance at 5% level. The critical values for the case of unrestricted intercept and no trend for k=5 and T=133 are Lower Bound I(0) =2.62; Upper Bound I(1) = 3.79. (Pesaran *et al,* 1999)

To obtain the number of coefficients with significant lags, the Akaike Information Criterion (AIC) was used (see Table 4.3). The appropriate number for lag length is then used in the ARDL model.

Table 4.3: The AIC for significance lags

Explanatory variable	Visits	TRP	KRP	Unemp	Oilprice	EXR
Significant lags	1	4	4	4	1	3

4.4 Analysis and interpretation of the results

Because the existence of a unique cointegration vector has been confirmed, the ARDL model can be estimated. Equation 3 was estimated in two models – to specify the effect of dummy variables in the long run and short run respectively.

4.4.1 Diagnostic tests

In order to ensure the model used was appropriate, the study used several diagnostic tests, such as the test for serial correlation (Breusch-Pagan LM), the heteroskedasticity test (LM), the Durbin Watson (DW) test and the Ramsey test. Based on the diagnostic test results, the estimated models were correctly specified. However, the heteroskedasticity test in both models failed to accept the null of constant variance, indicating the presence of heteroskedasticity. The adjusted R^2 indicates that the explanatory variables in both models explain about 56 per cent of the variations.

4.4.2 Results from the estimated regressions

The results describe the factors that affect international tourism demand in Tanzania. The ARDL approach indicated that tourism prices, world income and taste formation are the main determinants of international tourism demand. The dummy variables

showed that the September 2001 US terrorist attack also affected the number of international tourist arrivals in Tanzania (see Table 4.4).

From the results of an ARDL (1, 4, 4, 1, 4, 3) model, tourism price in Tanzania has statistically significant influence on the international tourism demand for Tanzania. The result indicates that the price elasticity of tourism in Tanzania is -3.7; therefore, a one per cent increase in Tanzania tourism price would lead to a decrease of more than three per cent of tourist arrivals in Tanzania. This implies that holiday visits to Tanzania are price-sensitive, given the 'luxury travel' nature of Tanzanian tourism and the presence of competitors in terms of wildlife (the backbone of Tanzanian international tourism), for example, Kenya and South Africa. Tourist prices for alternative destinations had no significant impact in explaining international tourism demand in Tanzania.

Theoretically the income of countries of origin is positively related to the volume of tourist arrivals. This also holds true in this study – as world income increases (evidenced by a decrease in the unemployment rate), the number of tourist arrivals to Tanzania increases. Income elasticity is nearly one per cent; that is, a one per cent decrease in the unemployment rate leads to an approximately 0.7 per cent increase in tourist arrivals. This result confirms that tourism is a luxury activity in Tanzania.

Taste formation (proxied in this study by lagged international tourist arrivals) is the most significant variable in explaining tourism demand in Tanzania. In the model, an increase of one per cent in the number of preceding month visitors leads to a 0.27 per

cent increase in current international tourist arrivals. This implies that there is a small proportion of tourists who return to the country or recommend the country to others.

It may be seen that the September 2001 US terrorist attacks had a temporary, negative effect on tourism demand in Tanzania, as the dummy variable has significant value (Table 4.4, Model 1). This incident temporarily decreased tourist arrivals by 0.3 per cent. The 1998 US embassy attack in Tanzania did not have any temporary or permanent effect on the model (see Appendix 1, dummy 3 and 4).

Table 4.4: The regression results of an ARDL model

	Model 1 ARDL (1,4,4,1,4,3) Dependent variable: Tourist arrivals				Model 2 ARDL (1,4,4,1,4,3) Dependent variable: Tourist arrivals			
Variable	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob
Taste	0.27***	0.09	3.01	0.003	0.29***	0.09	3.35	0.001
TRP	-3.72*	2.02	-1.84	0.068	-3.39*	2.02	-1.68	0.096
TRP_4	4.14**	1.94	2.13	0.035	3.89**	1.96	1.99	0.049
Unemp	-0.69*	0.39	-1.78	0.078	-0.71*	0.41	-1.74	0.085
Unemp_1	0.92*	0.48	1.91	0.059	1.084**	0.48	2.25	0.027
Dummy1	-0.30*	0.16	-1.94	0.055				
Constant	-2.76	4.19	-0.66	0.511	-3.41	4.91	-0.69	0.489
F(24, 103)	8.01 [p-value 0.0000]				7.72 [p-value 0.0000]			
Adj R2	0.5699				0.5596			
Serial Correlation LM test	1.402 [p-value 0.2363]				1.100 [p-value 0.2943]			
Heteroskedasticity LM test	7.60 [p-value 0.0058]				8.32 [p-value 0.0039]			
DW (25,128)	1.905311				1.917634			
Ramsey test F(3,100)	1.66[p-value 0.1809]				1.50[p-value 0.2191]			

Note: * significance at 10% level, **significance at 5% level, ***significance at 1% level.

Computed from data in Appendix I

4.4.3 Long -run relationship

Empirical results for the long-run relationship of the international tourism demand model for Tanzania are presented in Table 4.5 below. In the long term, it is domestic tourism prices, world income, transport costs and the exchange rate which have an impact on monthly international tourist arrivals in Tanzania. Alternative destination tourist prices and the September 2001 US terrorist attacks did not have long run effects to the international tourist demand in Tanzania.

Table 4.5: Long-run elasticities of tourism demand in Tanzania

Long-run elasticities Dependent variable: Tourist arrivals				
Variable	Coefficient	Std. Error	t-Statistic	Prob
KRP	-0.79518710	0.6289901	-1.26	0.209
Oilprice	-0.328845 **	0.1336361	-2.46	0.015
TRP	-1.815876 **	0.7024998	-2.58	0.011
Unemp	-0.90718 ***	0.2746606	-3.3	0.001
EXR	2.94790***	0.5830906	5.06	0.000
D2	-0.14276970	0.1665632	-0.86	0.393
D4	-0.2553911*	0.1373476	-1.86	0.065
Constant	-6.7117580 *	3.757588	-1.79	0.077
F(7, 124) 17.56 [p-value 0.000]				
Adj R2 0.4695				

* significance at 10% level, ** significance at 5% level, *** significance at 1% level.

The results show that in the long run, international tourism demand had tourism price elasticity of -1.8 and income elasticity of 0.9. The 1998 US embassy attack had a long-run effect, decreasing the number of tourist arrivals by 0.2 per cent. A one per cent increase in transport costs decreases the number of tourist arrivals by 0.3 per cent, while exchange rate elasticity was approximately three per cent.

4.4.4 Short- run relationship

Empirical results for the short-run dynamics of the international tourism demand model for Tanzania are presented in Table 4.6 below. The results indicate that three variables, namely world income, tourism prices and exchange rate, were statistically significant in determining tourism demand for Tanzania in the short run.

Table 4.6: Error-correction representation for the ARDL model

Error Correction Representation Dependent variable: D. Tourist arrivals				
Variables	Coefficient.	Std. Error	t-statistic	Prob
D.TRP_3	-3.135843*	1.797347	-1.74	0.084
D.Unemp	-1.079609***	0.3754807	-2.88	0.005
D.Unemp_4	-1.436848***	0.3880031	-3.70	0.000
D.exr_1	-3.01343**	1.46799	-2.05	0.043
ECT	-0.7357238***	0.1083517	-6.79	0.000
Constant	0.0803925	0.0629446	1.28	0.204
F(25, 101) 5.61 p[value 0.0000]				
Adj R2 0.4775				

* significance at 10% level, ** significance at 5% level, *** significance at 1% level

The empirical results demonstrate that domestic tourism prices, income and exchange rate had a negative impact on international tourism demand in Tanzania in the short run. Neither of the terror attack dummy variables had any short-run effect on international tourism demand for the specified period. The error correction term (ECT) was statistically significant and had the correct sign in the model, indicating that about 73 per cent correction in deviation from the long run relationship was made in the first month. The significance of the error correction term confirms the

existence of a long-run relationship between the variables in the model, and indicates a high-speed level of adjustment.

CHAPTER V – CONCLUSION

5.1 Summary

The purpose of this study was to model international tourism demand in Tanzania. The motivation for the study arose from the fact that the tourism industry in Tanzania is recognised as having the potential to support and accelerate the socio-economic development of the country, particularly as a supplier of foreign exchange earnings and employment. The sector also seems to contribute to the development of the country, by promoting the development of supporting sectors such as transport and construction; thus, it is regarded as one of the most important sectors in the economy.

The study examined the growth patterns of international tourism in the world, Africa and Tanzania over the years, and the contribution of the sector to GDP, investment and job creation in Tanzania. In specifying the model of international tourism demand in Tanzania, monthly time-series data spanning from 1996 to 2006 were analysed using an ARDL econometric method. Dummy variables were used to capture the influence of the 1998 US embassy bomb attack in Dar es Salaam and the 11 September 2001 US terrorist attacks.

The conceptual framework of this study involved choosing the appropriate variables for designing an appropriate model of international tourism demand in Tanzania. Finally, it was decided that an ARDL technique was most suited to understanding the factors that influence international tourism demand.

5.2 Main findings

Based on the objectives postulated earlier and with the support of various tests and estimations presented in the previous chapters, the following findings were extracted and proved worthy of discussion. The study established a model of international tourism demand in Tanzania using an ARDL technique, and the model confirmed that Tanzanian international tourism demand depends on domestic tourism prices, taste formation and income.

The study also isolated the factors that influence international tourism demand in Tanzania. Concurring with theory, the estimated results showed that tourism prices, taste formation, world income and the 11 September 2001 US terrorist attack had or have significant impact in explaining international tourism demand for Tanzania. Tourism prices have a negative effect on international tourism demand in Tanzania. The demand is also price-sensitive, with price elasticity of 3.7, indicating that it is possible for tourists to turn to other destinations if prices change. The results also indicated that an increase in world income increases the number of tourist arrivals to Tanzania. That income elasticity is close to unity confirms the theory that tourism is regarded as a luxury activity. The results also imply that a small proportion of tourists do return to the country or recommend the country to others. The September 2001 US terrorist attack had a temporary and negative impact on tourist demand in Tanzania.

5.3 Policy recommendations

The role of the tourism sector in promoting economic growth depends largely on the policy environment, and mainly on policies to do with factors that affect international tourism demand.

As Tanzanian international tourism demand seems to be price sensitive, tourists may easily turn to substitute markets if domestic prices are not seen as reasonable. Therefore the government should create more tourist products – especially in the South and West circuits, which have unique attractions, instead of concentrating on the North wildlife circuit, which has a lot of competition.

The government also needs to create favourable macroeconomic conditions, especially in maintaining low inflation, if the country is to reap the full economic benefit from the tourism sector.

The figure for income elasticity on Tanzanian tourism is close to unity, indicating that tourism is seen as a luxury activity. Hence there is a need for the government to keep in mind that when the world economy is booming, it is also a good time for Tanzania to increase investment in tourist attractions, improvement of infrastructure, accommodation, and hotels.

There is also a need to improve tourism hospitality (customer service), for example the training of staff who work in the tourism industry, and a need to improve the marketing of Tanzanian tourism products to the world. The government should also put more effort into diversifying existing tourism products to attract other tourism

activities, such as eco-tourism, cultural, conference and meeting tourism, instead of confining tourism to luxury activities only. To benefit from the industry in the long term, the government should ensure the sustainability of a safe and secure environment, free from terrorism and political instability.

The biggest challenge for the government is to continue creating a more conducive environment for growth in the tourism sector, in order to promote economic development. At the same time, it should use appropriate policies to promote related sectors, for example trade, infrastructure and hotels. This will ensure that the whole economy prospers simultaneously with the tourism sector, as more of the foreign exchange earned from tourism may be used for the growth of other sectors.

5.4 Limitations of the study

In executing this study a number of difficulties were encountered. The most pressing challenge was that of data availability. Economic variables alone are not sufficient to explain the model for determining the demand for international tourism; other qualitative variables were needed, such as temperature, health risks (for example, from malaria and other diseases) and quality of infrastructure (for example, roads and accommodation). All these were difficult to quantify in time series that could provide a better explanation of the model. Tanzania, like other developing countries, has a problem with maintaining time series data, particularly with regard to qualitative variables. As a result, the model did not capture all the variables that in theory ought to influence international tourism demand.

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APPENDICES

Appendix I: The regression results of an ARDL model

	Model 1 ARDL (1,4,4,1,4,3) Dependent variable: Tourist arrivals				Model 2 ARDL (1,4,4,1,4,3) Dependent variable: Tourist arrivals			
Variables	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob
Taste	0.2714***	0.090229	3.01	0.003	0.29931***	0.0893481	3.35	0.001
KRP	-0.2258866	1.810499	-0.12	0.901	-0.0573213	1.817969	-0.03	0.975
KRP_1	-4.061319	3.093033	-1.31	0.192	-4.183466	3.129724	-1.34	0.184
KRP_2	5.296818	3.249747	1.63	0.106	5.42152	3.282925	1.65	0.102
KRP_3	-1.239477	3.174697	-0.39	0.697	-1.19979	3.208987	-0.37	0.709
KRP_4	-0.1051419	1.808714	-0.06	0.954	0.0054702	1.834627	0	0.998
TRP	-3.72265*	2.020527	-1.84	0.068	-3.39210*	2.019834	-1.68	0.096
TRP_1	2.654433	3.109733	0.85	0.395	2.965648	3.144115	0.94	0.348
TRP_2	-0.4484764	3.110164	-0.14	0.886	-0.9115336	3.130605	-0.29	0.772
TRP_3	-4.090034	3.130046	-1.31	0.194	-3.932299	3.181655	-1.24	0.219
TRP_4	4.14122**	1.941509	2.13	0.035	3.89565**	1.955578	1.99	0.049
Oilprice	-0.0164133	0.23682	-0.07	0.945	0.047063	0.2350889	0.2	0.842
Oilprice_1	-0.247251	0.233727	-1.06	0.293	-0.3036773	0.233413	-1.3	0.196
Unemp	-0.6945123*	0.389603	-1.78	0.078	-0.705718*	0.4058987	-1.74	0.085
Unemp_1	0.9184137*	0.481665	1.91	0.059	1.076824**	0.4788451	2.25	0.027
Unemp_2	-0.5155919	0.465509	-1.11	0.271	-0.4936819	0.4745606	-1.04	0.301
Unemp_3	-0.1733531	0.471348	-0.37	0.714	-0.1638861	0.4861604	-0.34	0.737
Unemp_4	-0.4073949	0.412306	-0.99	0.325	-0.1672902	0.3949049	-0.42	0.673
EXR	0.5454604	1.509136	0.36	0.719	0.4660414	1.525747	0.31	0.761
EXR_1	-1.543295	2.284721	-0.68	0.501	-1.3932100	2.312417	-0.6	0.548
EXR_2	2.742583	2.279601	1.2	0.232	2.895741	2.308637	1.25	0.213
EXR_3	0.153015	1.520219	0.1	0.920	-0.1139506	1.573181	-0.07	0.942
Dummy1	-0.3040496*	0.156371	-1.94	0.055				
Dummy2					-0.1810097	0.1861592	-0.97	0.333

Dummy3	-0.0177257	0.163211	-0.11	0.914				
Dummy4					-0.0788603	0.1323063	-0.6	0.552
Constant	-2.76356	4.191221	-0.66	0.511	-3.405292	4.907413	-0.69	0.489
F(24, 103)	8.01 [p-value 0.0000]				7.72 [p-value 0.0000]			
Adj R2	0.5699				0.5596			
Serial Correlation LM test	1.402 [p-value 0.2363]				1.100 [p-value 0.2943]			
Heteroskedasticity LM test	7.60 [p-value 0.0058]				8.32 [p-value 0.0039]			
DW (25,128)	1.905311				1.917634			
Ramsey test F(3,100)	1.66[p-value 0.1809]				1.50[p-value 0.2191]			

*** significant at 1 per cent level, ** significant at 5 per cent level, * significant at 10 per cent level

Appendix II: Error correction representation for the ARDL model

Error Correction Representation Dependent variable: D. Tourist arrivals				
Variable	Coefficient	Std. Error	t-statistic	Probability
D. Visits_1	.0845792	.0906938	0.93	0.353
D.KRP	-.5691394	1.677004	-0.34	0.735
D.KRP_1	-3.727827**	1.818536	-2.05	0.043
D.KRP_2	2.259866	1.847612	1.22	0.224
D.KRP_3	-1.02532	1.895124	-0.54	0.590
D.KRP_4	-1.151735	1.694486	-0.68	0.498
D.TRP	-2.627417	1.841168	-1.43	0.157
D.TRP_1	-.4968726	1.915612	-0.26	0.796
D.TRP_2	1.559031	1.906894	0.82	0.416
D.TRP_3	-3.135843*	1.797347	-1.74	0.084
D.TRP_4	.9219818	1.780327	0.52	0.606
D.Oilprice	.0536493	.212113	0.25	0.801
D.Oilprice_1	.0327742	.2164208	0.15	0.880
D.Unemp	-1.079609***	.3754807	-2.88	0.005
D.Unemp_1	.1823489	.3891414	0.47	0.640
D.Unemp_2	-.0329853	.3466264	-0.10	0.924
D.Unemp_3	-.0903245	.4061911	-0.22	0.824
D.Unemp_4	-1.436848***	.3880031	-3.70	0.000
D.exr	2.054529	1.589872	1.29	0.199
D.exr_1	-3.01343**	1.46799	-2.05	0.043
D.exr_2	.754845	1.492202	0.51	0.614
D.exr_3	-1.631794	1.461465	-1.12	0.267
Dummy1	-.0075771	.1524686	-0.05	0.960
Dummy2	-.0329173	.0583463	-0.56	0.574
ECT	-.7357238***	.1083517	-6.79	0.000
Constant	.0803925	.0629446	1.28	0.204
F(25, 101) 5.61 p[value 0.0000]				
Adj R2 0.4775				

*** significant at 1 per cent level, ** significant at 5 per cent level, * significant at 10 per cent level